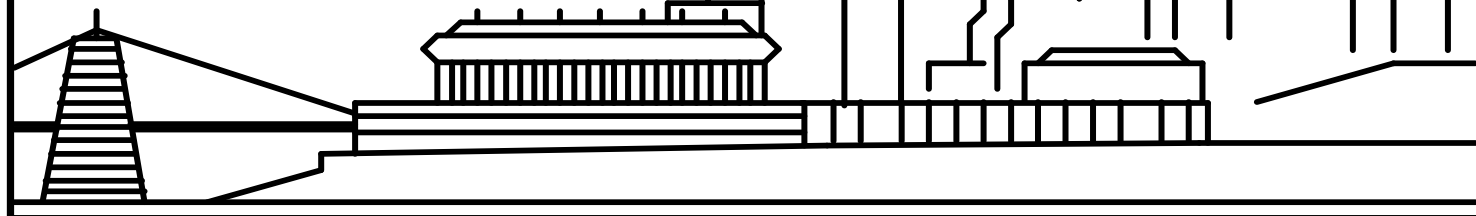




**INSTITUTE OF
ELECTRICAL &
ELECTRONICS
ENGINEERS, INC.**



OCTOBER 1993

IEEE CINCINNATI SECTION NEWSLETTER

OCTOBER MEETING: YOUR PROFESSIONAL EDGE

DATE: Thursday, October 28, 1993

PLACE: Institute of Advanced Manufacturing Sciences (IAMS)

TIME: 5:30 Social Time
6:00 Dinner
7:00 Program
8:15 Adjourn

COST: \$7.00 Members
\$3.00 Students
\$9.00 Non-Members

Reservations are required for dinner only!

CALL DEE SCOTT AT 385-9446 BY NOON, WEDNESDAY, OCTOBER 27th

Please provide NAME, MEMBER # and COMPANY NAME when making reservations

ABOUT THE PRESENTATION

As engineering students draw closer to graduation and entering the professional world, they need to be prepared with more than just an engineering degree. To compete in today's job market, new graduates require a professional edge. This "edge" not only helps them make the transition from student to engineer, it helps them throughout their entire engineering career. Find out how this "edge" is attainable for any student and how it is fun, challenging, and rewarding.

Background of the Speaker

K. James Phillips, Jr. P.E. received a Bachelor of Science Degree in Electrical Engineering with a Power Systems Option from Ohio State University. He has worked in various capacities with industries and utilities in power system design and analysis. He has also taught power system engineering topics at various seminars and at the college level.

Jim is a member of the IEEE and was Chairman of the Akron, Ohio Section (1992-93). He is a member of the Industry Applications Society and also the Power Engineering Society where he was a member of the 1993 Winter Power Meeting Student Activities Committee.

Jim is a member of the Precollege Education Committee of the IEEE-United States Activities in Washington, DC and is the Region 2 Precollege Math and Science Coordinator. Jim is the IEEE-USA representative serving on the Advisory Board of the AIME Transformations Project in Boston, MA. The "Transformations Project" is a series of educational programs directed at enhancing middle school students' understanding of Math, Science and Technology. He was recently a speaker at the 1993 Sessions Congress in San Juan, PR where he discussed Pre-College and SPAC Activities. He is a 1993 recipient of the US Activities Board Regional Professional Leadership Award.

He is a Registered PE in Ohio, Kentucky, and Florida.

CHAIRMAN'S MESSAGE

BY JIM EVERLY

Last month's tour of Cincinnati Sub-Zero Products was very interesting. The management, technical staff, and marketing personnel did an outstanding job of highlighting the capabilities of the company. I was impressed by the "degree of preparation" expended by them for the Cincinnati Section. The technical presentations, both formal and informal, were excellent. The cleanliness and organization of both office & manufacturing areas were exceptional. CONGRATULATIONS AND A SINCERE THANKS to the management and engineering staff of Cincinnati Sub-Zero Products for a job well done!!

This month our meeting is at IAMS and features Mr. James Phillips, former chairman of the Akron Section of IEEE. I met Mr. Phillips at the Region 2 Caucus of Sessions Congress '93 in San Juan, PR, during July. I was very impressed by his tutorial session "In Search of Diamonds" and his interest in student activities at the University of Akron. In his talk, he addresses the problem of student transition to full IEEE membership. His efforts made a big difference at the University of Akron, and since our July meeting he has reworked his talk. He will be presenting "Your Professional Edge" at our October meeting.

I have enclosed the 1993/1994 Cincinnati Section Meeting Calendar for your use in planning. As always, suggestions for meetings or tours are appreciated. As a final note, please watch for our annual ballot in the November/December newsletter. This will be an opportunity to choose the individuals that lead our IEEE Cincinnati Section. **Please be sure to vote: this is your organization.**

1993/1994 Cincinnati Section Meeting Calendar Cincinnati Section IEEE

MONTH	DATE	YEAR	ROOM
October	28	1993	Auditorium
December	9	1993	Seminar A
January	20	1994	Seminar A
February	24	1994	Seminar A
March	24	1994	Seminar A
April	21	1994	Seminar A

VOICE OF AMERICA

By Dick Reiman, Historian

In 1941, the war in Europe was escalating and the Axis propaganda machine was in full swing. It was outdoing the Allies' efforts by a factor of at least two in number and in power of the shortwave broadcast stations as well as hours on the air, languages, etc.

The Roosevelt administration, determined to do something about this, called a meeting of the leaders of companies in the broadcast equipment business, RCA, GE, Westinghouse and, although not a manufacturer, The Crosley Corporation of Cincinnati. It was included because of experience with high power AM transmitters (500 kw) and because of early experience in short wave broadcasting. Crosley, as far back as 1937, broadcast SW first with a "homemade" 10kw "rig", then with a 50kw unit made from an old WLW transmitter. At this time, they had two 50's on the air, WLWO and WLWK.

At this meeting, the government presented a need for six 200kw transmitters to broadcast to Europe, North Africa and South America in a time frame of 2 years or less. The three big companies said they couldn't do it without interfering with the war effort.

Mr. Shouse, President of Crosley, reportedly excused himself from the meeting to call Jim Rockwell, his chief engineer. Jim said something like "I think we can, we'll give it a good try,...". On that basis, a one page contract was written and we were on our way in early 1942. A site was selected and design work started.

There were a number of challenges for the relatively small team of engineers at Crosley:

- 200kw power level: This was twice that achieved by any transmitter to date. Development of the tubes for the job would start soon, but prototypes would not be available for two years.
- Unknowns in the capability of insulators and transmission lines at the high RF voltages required.
- High power circuit fault interruption.
- Wartime restrictions and shortages of steel, copper and electronic components.
- Shortages of manpower.

Ingenuity and adaptability were key to the solution of many of the problems.

A real tough problem was the high power RF amplifier where voltages could reach 50KV. How do you make a variable capacitor to work at 50KV? Using classical flux mapping techniques, a design was reached with a minimum radius of one inch on the edges of the plates. The cooling water jackets were designed for the big tubes when they became available but with adapters, smaller 100kw tubes were used in tests and early operation.

The unknowns in high voltage RF technology were tested in a unique test set-up which used a one-half wave transformer. Thus insulators, transmission lines, coupling networks, etc. were exposed to the real world.

Unique designs were developed for matching, tuning and coupling networks. The unique reentrant Rhombic antenna designs proven in application at WLWO would be installed in the antenna field behind the transmitter building. Lacking steel for support towers, an ingenious arrangement was devised. Two 45 foot wooden utility poles were connected at the butt ends with a metal sleeve and erected with guy wires to make a 90 foot support, four per antenna.

Primary circuit interruption proved to be a challenge. Even with the fastest circuit breakers available, the tremendous amount of energy delivered to a fault, say an arc in a power tube, by the 750KVA power supply could produce a meltdown. An electronic circuit interrupter, using back-to-back ignitron tubes in each phase, which could disconnect in 1/3 to 1/2 cycle was devised in a joint effort with Westinghouse. Current limiting devices were also used in primary and high voltage DC circuits.

Building of the station building, power substation, and antennas occurred in parallel with the transmitter development. The latter was done in a rented building in downtown Cincinnati. In fact, much had to happen at the same time to meet the schedule.

Final assembly of the transmitters took place on the site. By the Spring of 1944, the first transmitter was up and running and in a little over two years, the whole station was operational, which was a truly remarkable feat considering the small engineering staff and the wartime obstacles.

At that time, it was the most powerful Short Wave Station in the world. Those transmitters remained in operation for 47 years after which they had to be replaced because power tubes were no longer available.

NOTE: Special thanks to C.C. Bopp for this History of The Voice of America

**WELCOME TO NEW IEEE MEMBERS AND
CURRENT IEEE MEMBERS WHO HAVE MOVED INTO OUR SECTION**

The following individuals are new IEEE members in the Cincinnati Section:

David D. Aitken
James C. Hall

James R. Korcykoski
David L. McDaniel

James P. Roman

The following IEEE members have moved into the Cincinnati Section:

Scott D. Brusaw
Rhody Y. Cohon
Walter S. Conway
Robert E. Estes, Jr.

James D. Habegger
Donna S. Haun
John L. Hellmann

Ryan J. Lucas
Kyle M. Moothart
Michael A. Motley

Blessed Numetu
Bikash Sabata
Amy Beth Williamson

Dee Scott (call for meeting reservations)	385-9446
Jim Everly - Chairman	777-7129 (Home); 556-4224 (Fax)
	556-4241 (Office)
Bill Lohner - Vice Chairman	385-7268
Orest Melnyk - Treasurer	397-9212
Steve Olenick - Secretary	573-6555
Bob Morrison - Editor	287-3697 (Office); 287-3698 (Fax)

OCTOBER 1993

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University of Cincinnati
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Cincinnati, OH 45221

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